

REMARKS

Favorable reconsideration of this Application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 8-18 remain pending in the present Application. Claims 8-18 have been amended. Support of the amendment of Claims 8-18 can be found at least on page 15, lines 13-21 and Figs. 6-8 of the specification. Since all elements of the claims were earlier claimed or inherent in the claims as examined, no new issues are presented; thus, it is respectfully requested that the Examiner enter the response on the record. The response will present Applicant's position in better form for appeal. No new matter has been added.

By way of summary, the Official Action presents the following issues: Claims 8-10 stands rejected under 35 U.S.C. § 103 as being unpatentable over Takagi et al. (U.S. Patent No. 4,949,326, hereinafter Takagi); Claims 11-17 stand rejected under 35 U.S.C. § 103 as being unpatentable over Takagi and Howe et al. (U.S. Patent No. 6,112,324, hereinafter Howe), and further in view of Sako et al. (U.S. Patent No. 5,966,359, hereinafter Sako); and Claim 18 stands rejected under 35 U.S.C. § 103 as being unpatentable over Takagi and Howe, and further in view of Sako in further view of Hartness (U.S. Patent No. 4,775,978).

REJECTION UNDER 35 U.S.C. § 103

The Official Action has rejected Claims 8-10 under 35 U.S.C. § 103 as being unpatentable over Takagi in view of Howe. The Official Action cites Takagi as disclosing the Applicant's invention with the exception of sectors having a specific content. The Official Action cites Howe as disclosing physical and logical sectors and states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to

combine the teachings of the cited references to arrive at the Applicant's claims. Applicant respectfully traverses the rejection.

Amended Claim 8 recites, *inter alia*, an optical disk including:

“ . . . a first logical data structure including at least a user data and control information disposed in a first ECC block;
a second logical data structure including at least an ID information of a physical sector disposed in a second ECC block, the first and second ECC blocks are coded independently for error correction; and
wherein the first ECC block and the second ECC block form a single physical data structure.”

By way of background, optical discs are known in which data sectors provide user data, ID information and control information. Upon scrambling the main data in the data sectors, Reed-Solomon error correction coding information is added to each group of 16 data sectors to form an ECC block with supplementary inner-code parity (PI) and outer-code parity (PO). Finally, 8-14 (EFM) channel modulation is applied to the ECC blocks to create a physical sector, which is the actual format recorded on the disc.¹

In order to store dynamic images, a disc formatted along the lines above is susceptible to burst error as the above-described error correction does not ensure proper data integrity. Thus, it has been proposed to enlarge the error-data correcting code to account for this problem, yet, such an enlargement is not presently feasible as ID information of the physical sector interferes with the positioning of this enlarged correction code so that it is difficult to dispose the logical sector in the direction of the error-correcting code. Thus, a physical sector full of parity word cannot be placed in the same physical sector as the ID and enlarged correction code due to space constraints.²

¹ In this case, the optical disc described is a compact disc (CD), however, a digital versatile disc (DVD) includes like formatting. The term “physical” in this sense refers to positional ordering of data, not the physical characteristics of the underlying optical medium.

² Application at pages 1-6.

In light of the above deficiency in the art, the present invention is provided. With this object in mind, a brief comparison of the claimed invention, in view of the cited references, is believed to be in order.

Takagi discloses a read only (RO) optical disc in which defective sectors of an optical disc are identified and mapped to an alternate area. To this end, an optical disc (1) is provided having blocks (15), each block comprising a plurality of tracks. An alternate area (16) is provided to record defective sectors which overflow from alternate mapping areas (19).³ As shown in Fig. 3A, the block has n-tracks, each having data sectors (S1 to S16) for recording or reproducing data and one track composed of alternate sectors R (R1 to R7 and R8 to R14), which alternate defective sectors of the data sectors S, and mapping sectors (M1 and M2) which manage address correspondence information for the alternative defective sectors and the alternate sectors.⁴ Thus, as can be appreciated by the flowcharts shown in Figs. 14-16, defective sectors can be replaced with alternate sectors in accordance with mapping information.

Howe discloses a compact disc formatted to function as direct access storage device (DASD). The compact disc storage media includes DASD format in which independently addressable sectors each include sector headers produced prior to any writing of information onto the disc. A logical sector sequence is shown in Fig. 8. The logical sector of the CD-DASD format includes a header (90), a preamble (92), a data/ECC parity area (94) and a buffer area (96).⁵ ECC blocks are formed by C1 and C2 codes in the usual manner by cross-interleaved Reed-Solomon (CIRC) coding of compact disc systems. As can be appreciated,

³ Takagi at column 4, lines 39-45.

⁴ Takagi at column 4, lines 57-65.

⁵ Howe at Fig. 7.

the specific DASD formatting enables a conventional compact disc direct access storage device capability.

Conversely, Applicant's invention provides a data format for use with an optical disc in which logical data structures are distributed among ECC blocks for forming a single physical data structure. The resulting physical data structure enables a frame synchronization signal FS to provide frame synchronization, an ID information of a physical sector is used for sector synchronization to identify the data position in a block. Thus, the ID information is positioned in the same location in each physical sector, in this way, since ECC blocks 1 and 2 are independent of each other in this respect, the logical sector can be composed without worrying about the position of the ID information therein.⁶

By way of example, as recited in amended Claim 8, an exemplary embodiment of the Applicant's invention provides a first logical data structure including at least a user data and control information disposed in a first ECC block. A second logical data structure including at least an ID information of a physical sector disposed in a second ECC block. The first and second ECC blocks are coded independently for error correction, and the first ECC block and the second ECC block form a single physical data structure. Thus, Applicant's logical data structure enables the utilization of a long distance code LDC enabling a single pass for data correction purposes as the LDC includes multiple parities and is configured with a deep interleave which is more suitable for image recording/reproduction. Neither Takagi, alone or in combination with Howe, disclose or suggest the Applicant's invention as recited in amended Claim 8 or any claim depending therefrom. Likewise, as independent Claim 10 recites substantially the same limitation is allowable at least for the same reasons discussed above.

⁶ Application at page 15, lines 13-21.

Accordingly, Applicant respectfully requests that the rejection of Claims 8-10 under 35 U.S.C. § 103 be withdrawn.

The Official Action has rejected Claims 11-17 under 35 U.S.C. § 103 as being unpatentable over the combination of Takagi and Howe as discussed in the rejection above, and further in view of Sako. The Official Action states that Takagi and Howe disclose all of the Applicant's claim limitations with the exception of a long error detection code. The Official Action cites Sako as teaching this more detailed aspect of the Applicant's invention and states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the cited references for arriving at the Applicant's claims. Applicant respectfully traverses the rejection.

Sako discloses a CD format as shown in Fig. 11 in which C1 and C2 parity are employed as a two-dimensional arrangement. A long distance code is also mentioned as a possibility to the two-dimensional parity.

As discussed above, Takagi, neither along or in combination with Howe, disclose or suggest the Applicant's data structure in which the logical data structure can be formed independent of the location of the ID information corresponding to the physical sector location. Likewise, Sako does not remedy this deficiency, and therefore, none of the cited references, either along or in combination, can properly be asserted as disclosing or suggesting Applicant's Claims 11-17 which include the above distinguished limitations by virtue of independent recitation or dependency. Therefore, the Official Action does not provide a *prima facie* case of obviousness with regard to any of these claims.

Accordingly, Applicant respectfully requests that the rejection of Claims 11-17 under 35 U.S.C. § 103 be withdrawn.

The Official Action rejected Claim 18 under 35 U.S.C. § 103 as being unpatentable over Takagi, Howe and Sako as discussed above in further view of Hartness. The Official Action states that the combination of Takagi, Howe and Sako disclose all the Applicant's claim limitations with the exception of ECC blocks. The Official Action cites Hartness as disclosing this more detailed aspect of the Applicant's invention and states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the cited references for arriving at the Applicant's claim. Applicant respectfully traverses the rejection.

Hartness discloses a data error correction system. As shown in Fig. 1, data blocks are provided having a fixed number of bits and ECC generators are provided, error correction and detection data for each data sub-block which is received on an input path.⁷

As discussed above, Takagi, neither alone or in combination with Howe or Sako, discloses or suggests the Applicant's data structure in which the logical data structure can be formed independent of the location of the ID information corresponding to the physical sector location. Likewise, Hartness does not remedy the deficiency, and therefore, Hartness, neither alone or in combination with Takagi, Howe and/or Sako can properly be asserted as disclosing or suggesting Applicant's Claim 18, which includes the above distinguished limitations by virtue of independent recitation. Therefore, the Official Action does not provide a *prima facie* case of obviousness with regard to Claim 18.

Accordingly, Applicant respectfully requests that the rejection to Claim 18 under 35 U.S.C. § 103 be withdrawn.

⁷ Hartness at column 5, lines 33-53.

CONCLUSION

Consequently, in view of the foregoing amendment and remarks, it is respectfully submitted that the present Application, including Claims 8-18, is patentably distinguished over the prior art, in condition for allowance, and such action is respectfully requested at an early date.

Respectfully submitted,

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